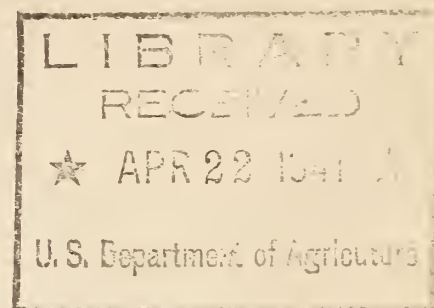


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MILL REQUIREMENTS  
IN RELATION TO COTTON-QUALITY IMPROVEMENT

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and

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# MILL REQUIREMENTS IN RELATION TO COTTON-QUALITY IMPROVEMENT

By

John W. Wright, Senior Agricultural Economist  
and

Fred Taylor, Senior Cotton Technologist

A program designed to increase the income of cotton growers and improve the competitive position of American cotton by improving the quality of cotton produced in the United States has been in progress during recent years. The principal features of the program are the development of superior varieties of cotton and the standardization of the production of such varieties in areas served by individual gins in order to maintain the pure varieties and to facilitate marketing.

This program, which is sponsored by Federal, State, and private agencies, was participated in by more than 135,000 cotton growers who produced more than 1,500,000 bales of cotton during the season 1939-40. <sup>1/</sup> There has been a material increase both in number of farmers participating and in quantity of cotton produced under the program during the 1940-41 season. In view of the proportion of the crop now included, the program is of considerable significance from the standpoint of cotton growers, marketing agencies, and manufacturers.

## THE NEED FOR COORDINATING COTTON-QUALITY IMPROVEMENT AND MARKETING WITH MILL REQUIREMENTS

The development of a sound program of cotton-quality improvement and marketing must be based upon adequate factual information with respect to market outlets for the cotton and the requirements and preferences of those who are to use it. Otherwise, maladjustments between qualities of cotton available and qualities most suitable for the manufacture of specific types of products are likely to develop. In deciding what variety of cotton to plant, farmers need to know the kind of cotton that mills want to buy because mill preference is a very definite price factor in the case of any particular quality of cotton.

The cotton-textile industry manufactures a wide range of products to meet the many needs of consumers of cotton goods. The needs of consumers vary greatly. Some require fine and some coarse materials. Some require very cheap goods. Others are willing and able to

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<sup>1/</sup> Data supplied by Bureau of Plant Industry, U. S. Department of Agriculture.

pay higher prices for goods of the particular qualities desired. In order to supply the kind of goods for which they have a market, some cotton manufacturers require or prefer cotton of long, fine fiber, whereas others prefer or require cotton of short, coarse fiber for specific types of goods. Some even find cotton mill waste and linters best adapted to the cheap fabrics to be turned out for certain groups of consumers.

Progress in the improvement of cotton quality is facilitated by the standardization of production by variety in areas served by individual gins. This tends to eliminate the mixing of varieties at the gin as well as the cross-pollination of varieties in the field. There are advantages also in standardizing production by variety in relatively extensive producing areas from which cotton of even-running quality can be assembled for marketing in commercial lots. Specific varieties and strains of cotton, however, produce fiber of definite characteristics that are significant from the standpoint of manufacturing. Accordingly, there is need for the Cotton Belt as a whole to diversify to some extent the varieties of cotton grown in order that the wide range in qualities of raw cotton required by manufacturers may be supplied. Not all spinners manufacture yarns and fabrics for which cotton of a given variety is most desirable or most economical.

To coordinate cotton production with the quality requirements and preferences of mills, it is necessary to know what quantities of various qualities of cotton are required for specific uses. Such information supplemented by data relative to the qualities obtained from the different varieties grown in the several producing areas, should provide the basis for guiding the program for cotton-quality improvement. To supply this type of information insofar as the domestic situation is concerned, this study was undertaken.

The results of the study should prove mutually advantageous to cotton growers, marketing agencies, and spinners. Growers are now provided with a basis for adjusting their program of production to mill demand, particularly with respect to staple length. To the extent that growers are guided by this information, spinners will benefit by having available the qualities of cotton required for best results in manufacturing various types of products. The resulting adjustment of qualities produced to mill demand facilitates the marketing process. Agencies sponsoring the cotton-improvement program and service activities in cotton marketing are aided by having available a factual basis for guidance in their work.

### METHODS EMPLOYED IN THE STUDY

Data relative to quantities and qualities of cotton consumed by domestic mills during the season 1938-39, the sources of the cotton, and related information were obtained from cotton manufacturers representing approximately 75 percent of the active cotton spindles in the United States during that year (table 1). Samples of cotton used for specific types of cotton goods were obtained and classed by the Appeal Board of Review Examiners as a basis for adjusting the consumption data in terms of the Official Cotton Standards of the United States.

Table 1. - Proportions of total cotton spindles included in study of domestic consumption of cotton, by States, season 1938-39

State	: Percentage of total : cotton spindles
	: <u>Percent</u>
Alabama .....	: 87
Georgia .....	: 81
Mississippi .....	: 100
North Carolina .....	: 67
South Carolina .....	: 72
Tennessee .....	: 94
Texas .....	: 83
Virginia .....	: 82
Other cotton-producing States .....	: 48
Non-cotton-producing States .....	: 75
United States .....	: 75

Data based on survey of domestic cotton mills.

The mills included in the study were selected to provide a representative cross section of cotton consumption in the United States from the standpoints of products manufactured, size of mill, type of equipment employed, and geographic distribution of the cotton manufacturing industry. In view of this selection and the large proportion of the industry included in the study, it is believed that the data provide a fairly accurate indication of the situation with respect to the consumption of cotton by domestic mills. Although the consumption data relate specifically to the cotton year 1938-39 -- the most recently completed cotton year at the time the study was begun -- they are believed to be fairly indicative of the situation prevailing sub-

sequently. There were, however, substantial increases both in domestic consumption and in exports during the season 1939-40 as compared with the season 1938-39.

The data have been tabulated and analyzed by States for the principal States that are engaged in both cotton production and cotton manufacturing, and as a single group for the non-cotton-producing States. The proportions of the various qualities of cotton consumed, as determined from the sample, have been applied in each instance in raising the bale figures to total consumption. This was done in order to provide an indication of the present relationship of production and consumption from the standpoint of quality on a State basis.

In assembling data relative to quantities and qualities of cotton consumed by mills included in the study, an attempt was made to develop specific information concerning the place of growth of the cotton. Much of the cotton, however, was received from large concentration points where the identity of the cotton by place of growth had been lost; so it was not feasible, in many instances, to ascertain the specific source or sources except in terms of the entire producing territory served by the concentration point from which the cotton was received by the mill. Furthermore, even in the case of mills using local cotton but located near State lines, it was not always possible to ascertain definitely the State in which specific lots of cotton were grown. In view of this situation, it was found necessary to make rather broad groupings of producing territory for indicating the sources of the cotton consumed in each of the principal cotton manufacturing States or group of States.

Data relative to quantities and qualities of cotton produced that are used for comparative purposes have been taken from published reports of the Department. These reports are specifically indicated in each instance.

The findings of the study are being made available in this preliminary form for the tentative use of interested agencies. Although the grade and character elements of cotton quality are very important to cotton manufacturers and are being given careful consideration in the programs to improve cotton production, ginning, and marketing, it has not been possible to include information about these elements in this preliminary report. It is expected that as the study progresses, more inclusive and more precise data than contained in this report can be developed and the nature of any definite trends indicated.

It should be recognized in connection with a study of this type that the requirements and preferences of cotton manufacturers are not static. The qualities in demand are subject to change with changes in the products manufactured, with the development of new products or new uses, with developments in techniques of manufacturing, as well as with changes in relative prices of cotton of different qualities. Although these changes usually are gradual, they should not be overlooked in connection with an interpretation of the results of the study. By continuing the study over a period of years, it will be possible to indicate trends in manufacturers' requirements and preferences. Information with respect to such trends should be especially valuable in guiding the development of cotton-improvement and marketing programs.

#### STAPLE LENGTH OF COTTON CONSUMED BY DOMESTIC MILLS IN RELATION TO COTTON PRODUCTION IN THE UNITED STATES

Cotton consumed by domestic mills includes a wide range of staple lengths. More than 88 percent of the consumption of American-grown cotton, however, is within the range of  $7/8$  inch to  $1-3/32$  inches (table 2). Almost 11 percent is  $1-1/8$  inches and longer, and less than 1 percent is shorter than  $7/8$  inch.

Although the cotton crop of the United States greatly exceeds consumption in this country, the surplus above domestic mill requirements is much greater for some staple lengths than for others. The production of cotton shorter than  $7/8$  inch has averaged more than one-half million bales during the last few years, but domestic consumption of the short cotton included in this category appears to be only about 10 percent of the quantities produced. There has been, however, a declining trend in the proportion of the United States crop represented by cotton shorter than  $7/8$  inch. Present indications are that this decline has been precipitous during the 1940-41 cotton season. This, no doubt, is attributable in large measure to the program of cotton-quality improvement as a result of which varieties that produce short staple cotton have been replaced, in some producing areas, by varieties that produce longer fiber.

Likewise, the recent trend in the production of cotton of  $7/8$ -inch staple has been a sharply declining one. Only about one-third of the cotton of this staple length produced in the United States is used by domestic mills.

For cotton  $15/16$  inch and longer, the major portion of the American crop is consumed by domestic mills: Indications are that during the season 1938-39, domestic consumption of American-grown cotton  $1-3/16$  inches and longer exceeded the quantities of cotton of these lengths in the United States crop and that the excess was drawn from accumulated stocks.

Table 2. - Estimated consumption of cotton in the United States, by staple length, season 1938-39, in comparison with production, seasons 1938-39, 1939-40, and 1940-41

Staple length (inches)	Estimated		Production <sup>2/</sup>		
	consumption				
	1938-39		1938-39	1939-40	1940-41
	<u>1/</u>				<u>3/</u>
	<u>1,000</u>	<u>Pct.</u>	<u>1,000</u>	<u>1,000</u>	<u>1,000</u>
	<u>bales</u>		<u>bales</u>	<u>bales</u>	<u>bales</u>
Shorter than 7/8 .....	53.6	1	510.2	625.4	224.6
7/8 and 29/32 .....	569.8	8	2,005.9	2,397.9	1,387.7
15/16 and 31/32 .....	1,735.9	26	3,124.5	2,779.8	2,784.7
1 and 1-1/32 .....	2,167.9	32	2,964.4	3,351.1	3,947.7
1-1/16 and 1-3/32 .....	1,485.9	22	2,023.8	1,762.0	2,425.1
1-1/8 and 1-5/32 .....	463.1	7	764.2	425.7	527.9
1-3/16 and longer <u>4/</u> .....	259.9	4	230.2	137.4	134.6
No staple <u>5/</u> .....	-	-	-	2.0	1.0
All lengths .....	6,736.1	100	11,623.2	11,481.3	11,433.3

<sup>1/</sup> Estimate based on data obtained from cotton mills, adjusted for classification on official cotton standards.

<sup>2/</sup> Based on published reports of Agricultural Marketing Service.

<sup>3/</sup> Ginnings through December 12, 1940.

<sup>4/</sup> Includes American-Egyptian and sea-island cottons.

<sup>5/</sup> Includes bales for which, because of character defects, no specific length designation was assigned.

The available data concerning changes in the staple length of cotton consumed by domestic mills indicate that there have been significant decreases in the proportions of total consumption represented by cotton of staple lengths 7/8 inch and shorter (table 3). On the other hand, there has been a decided increase in the proportions represented by cotton of the staple lengths 1 inch and longer. This is especially pronounced in the case of 1-1/16-inch cotton.

With the possible exception of cotton 1-1/8 inches and longer and the very short cotton now obtained from the Orient, there are ample quantities of all staple lengths available in the American crop to meet the requirements of the cotton-textile industry of the United States. The situation appears somewhat different, however, when considered from the standpoint of individual States. In some localities in the Southeastern States, recent trends in the staple length of cotton produced is resulting in significant adjustments either in the staple length of cotton consumed by local mills or in sources of raw cotton for such mills.

Table 3. - Proportions of American upland cotton of specified staple lengths consumed by domestic mills during specified years (estimated)

Staple length (inches)	Cotton year				
	1926-27 1/	1927-28 1/	1930-31 2/	1931-32 2/	1938-39 3/
	Percent	Percent	Percent	Percent	Percent
Shorter than 7/8	4/	1	10	10	1
7/8 and 29/32	19	29	37	36	8
15/16 and 31/32	34	27	18	19	26
1 and 1-1/32	35	29	19	20	32
1-1/16 and 1-3/32	6	6	10	10	22
1-1/8 and longer	6	8	6	5	11
Total	100	100	100	100	100

1/ Strang, P. M., Quality of Cotton Spun in the United States (Year ending July 31, 1928). Bureau of Agricultural Economics, June 1929, p. 6. (Preliminary mimeographed report.)

2/ Lanham, W. B., and Weaver, O. T., Grade and Staple Length of American Upland Cotton Consumed in the United States, 1930-31 and 1931-32. Bureau of Agricultural Economics, December 1933, pp. 15 and 19. (Preliminary mimeographed report.)

3/ Estimate based on data obtained from cotton mills, adjusted for classification on official cotton standards.

4/ Less than 0.5 percent.

Alabama's total consumption of cotton is usually somewhat less than the production of cotton within the State. For the State as a whole, ample quantities of cotton of staple lengths shorter than 1-1/16 inches are available in the State's own crop (table 4). Consumption of cotton 1-1/16 inches and longer in staple exceeds the State's production of such cotton. In producing areas adjacent to some mills, however, there appears to have been a substantial increase in the production of cotton 1 inch and longer in staple and a corresponding decrease in the production of the shorter staples. This has enabled some mills to obtain locally cotton that formerly had been obtained from more distant areas. On the other hand, according to reports of some mills, this change in the staple length of cotton produced locally has necessitated the discontinuance of purchases of local cotton and the purchase of short-staple cotton produced in other areas.

Table 4. - Estimated consumption of cotton in Alabama, by staple length, season 1938-39, in comparison with production, seasons 1938-39, 1939-40, and 1940-41

Staple length (inches)	Estimated consumption		Production <sup>2/</sup>			
	1938-39		1938-39	1939-40	1940-41	
	<sup>1/</sup>				<sup>3/</sup>	
	1,000	Pct.	1,000	1,000	1,000	1,000
	bales		bales	bales	bales	bales
Shorter than 7/8 .....	12.4	2	49.7	14.4		15.6
7/8 and 29/32 .....	122.9	17	341.2	182.6		147.2
15/16 and 31/32 .....	272.0	37	399.4	379.6		300.0
1 and 1-1/32 .....	155.6	21	249.2	183.4		234.6
1-1/16 and 1-3/32 .....	143.3	20	18.8	8.2		12.8
1-1/8 and 1-5/32 .....	3.7	1	3.1	1.0		.4
1-3/16 and longer .....	15.4	2	3.0	.4		.2
No staple <sup>4/</sup> .....	-	-	-	.1		.2
All lengths .....	725.3	100	1,064.4	769.7		711.0

<sup>1/</sup> Estimate based on data obtained from cotton mills, adjusted for classification on official cotton standards.

<sup>2/</sup> Based on published reports of Agricultural Marketing Service.

<sup>3/</sup> Ginnings through November 30, 1940.

<sup>4/</sup> Includes bales for which, because of character defects, no specific length designation was assigned.

Georgia mills, during recent years, have consumed somewhat more cotton than is produced within the State. Consumption in 1938-39 exceeded production for all staple lengths except those shorter than 7/8 inch (table 5). Some Georgia mills consume large quantities of cotton 7/8-inch and 15/16-inch staples and in the past they have obtained it locally to a large extent. During recent seasons, the supplies of such cotton have been more limited in the crop in certain localities in the State, so that some mills have found it necessary to look elsewhere for a supply of the qualities desired. For the State as a whole, however, the consumption of cotton longer than 1 inch greatly exceeds the production of such cotton.

Table 5. - Estimated consumption of cotton in Georgia, by staple length, season 1938-39, in comparison with production, seasons 1938-39, 1939-40, and 1940-41

Staple length (inches)	Estimated consumption			Production <sup>2/</sup>		
	1938-39			1938-39	1939-40	1940-41
	<sup>1/</sup>					<sup>3/</sup>
	1,000	Pct.		1,000	1,000	1,000
	bales			bales	bales	bales
Shorter than 7/8 .....	17.5	1		19.2	28.7	11.5
7/8 and 29/32 .....	277.6	21		245.8	188.0	160.4
15/16 and 31/32 .....	366.1	27		280.8	339.8	290.3
1 and 1-1/32 .....	378.2	28		258.0	316.6	429.7
1-1/16 and 1-3/32 .....	243.4	18		40.5	31.9	60.2
1-1/8 and 1-5/32 .....	18.9	2		3.3	1.8	1.9
1-3/16 and longer <sup>4/</sup> .....	35.8	3		3.1	2.0	3.2
No staple <sup>5/</sup> .....	-	-		-	.2	-
All lengths .....	1,337.5	100		850.7	909.0	957.2

<sup>1/</sup> Estimate based on data obtained from cotton mills, adjusted for classification on official cotton standards.

<sup>2/</sup> Based on published reports of Agricultural Marketing Service.

<sup>3/</sup> Ginnings through November 30, 1940.

<sup>4/</sup> Includes sea-island cotton.

<sup>5/</sup> Includes bales for which, because of character defects, no specific length designation was assigned.

Mississippi's consumption of cotton is small in relation to production in that State. Cotton mills operating in the State are producing, for the most part, coarse goods for which cotton of 7/8-inch to 1-inch staple is desired (table 6). Ample supplies of such cotton are available locally.

North Carolina mills usually consume about four or five times as many bales of cotton as are produced in the State (table 7). For this reason, there usually has been a local outlet for all qualities of cotton in the local crop. In past years, the local crop of cotton of cotton of 7/8-inch staple and shorter has more nearly equaled local consumption than has been the case for cotton longer than 7/8 inch. The

sharp decrease in the production of cotton of staples 15/16 inch and shorter that has taken place in recent years, particularly during the 1940 season, and the corresponding increase in the production of staples 1 inch to 1-1/16 inches in length are of considerable significance. Although the production of cotton of 1-1/16-inch staple apparently has not yet reached the limit of the local outlet for such cotton, it appears to be approaching that limit. On the other hand, some mills in the State now appear to be experiencing difficulty in obtaining sufficient quantities of 15/16-inch staple in the local crop to meet their requirements.

Table 6. - Estimated consumption of cotton in Mississippi, by staple length, season 1938-39, in comparison with production, seasons 1938-39, 1939-40, and 1940-41

Staple length (inches)	Estimated		Production <sup>2/</sup>		
	consumption				
	1938-39		1938-39	1939-40	1940-41
	<sup>1/</sup>				<sup>3/</sup>
	<u>1,000</u>	<u>Pct.</u>	<u>1,000</u>	<u>1,000</u>	<u>1,000</u>
	<u>bales</u>		<u>bales</u>	<u>bales</u>	<u>bales</u>
Shorter than 7/8 .....	-	-	5.3	0.9	-
7/8 and 29/32 .....	6.5	16	25.7	25.8	5.7
15/16 and 31/32 .....	6.7	17	132.7	149.1	59.8
1 and 1-1/32 .....	21.2	54	407.0	534.3	352.8
1-1/16 and 1-3/32 .....	5.2	13	646.5	508.6	428.6
1-1/8 and 1-5/32 .....	-	-	296.0	234.7	233.3
1-3/16 and longer .....	-	-	142.8	82.8	69.0
No staple <sup>4/</sup> .....	-	-	-	.1	-
All lengths .....	39.6	100	1,656.0	1,536.3	1,149.2

<sup>1/</sup> Estimate based on data obtained from cotton mills, adjusted for classification on official cotton standards.

<sup>2/</sup> Based on published reports of Agricultural Marketing Service.

<sup>3/</sup> Ginnings through December 12, 1940.

<sup>4/</sup> Includes bales for which, because of character defects, no specific length designation was assigned.

Table 7. - Estimated consumption of cotton in North Carolina, by staple length, season 1938-39, in comparison with production, seasons 1938-39, 1939-40, and 1940-41

Staple length (inches)	Estimated		Production <sup>2/</sup>		
	consumption				
	1938-39		1938-39	1939-40	1940-41
	<sup>1/</sup>				<sup>3/</sup>
	<u>1,000</u>	<u>Pot.</u>	<u>1,000</u>	<u>1,000</u>	<u>1,000</u>
	<u>bales</u>		<u>bales</u>	<u>bales</u>	<u>bales</u>
Shorter than 7/8 .....	3.6	<sup>4/</sup>	3.2	6.0	1.4
7/8 and 29/32 .....	28.6	2	41.7	45.2	13.9
15/16 and 31/32 .....	566.8	32	88.6	102.5	57.5
1 and 1-1/32 .....	652.2	37	166.7	231.4	285.6
1-1/16 and 1-3/32 .....	316.4	18	76.3	62.2	293.9
1-1/8 and 1-5/32 .....	112.4	7	16.6	6.8	33.3
1-3/16 and longer .....	75.7	4	5.4	7.4	7.6
No staple <sup>5/</sup> .....	-	-	-	.2	-
All lengths .....	1,755.7	100	398.5	461.7	693.2

<sup>1/</sup> Estimate based on data obtained from cotton mills, adjusted for classification on official cotton standards.

<sup>2/</sup> Based on published reports of Agricultural Marketing Service.

<sup>3/</sup> Ginnings through November 30, 1940.

<sup>4/</sup> Less than 0.5 percent.

<sup>5/</sup> Includes bales for which, because of character defects, no specific length designation was assigned.

South Carolina consumed 1,364,835 bales of American-grown cotton during the 1938-39 cotton year (table 8). Production in the State during recent years has been approximately one-half to two-thirds of consumption. Although consumption of cotton of all staple lengths has usually exceeded the State's production, the production of the staples shorter than 1 inch has represented a somewhat larger proportion of the State's consumption than in the case of staples longer than 1 inch. This situation now appears to be changing somewhat as evidenced by reports on the 1940 crop. The production of cotton 1 inch to 1-1/16 inches in staple length now appears to represent a larger proportion than formerly of the consumption within that range of staple lengths.

Table 8. - Estimated consumption of cotton in South Carolina, by staple length, season 1938-39, in comparison with production, seasons 1938-39, 1939-40, and 1940-41

Staple length (inches)	Estimated		Production <sup>2/</sup>		
	consumption				
	1938-39	1938-39	1938-39	1939-40	1940-41
	<sup>1/</sup>				<sup>2/</sup>
	1,000	Pot.	1,000	1,000	1,000
	bales		bales	bales	bales
Shorter than 7/8 .....	-	-	0.8	0.3	-
7/8 and 29/32 .....	45.3	3	24.1	34.2	26.5
15/16 and 31/32 .....	234.2	17	179.9	307.9	221.6
1 and 1-1/32 .....	564.0	41	303.4	420.0	533.5
1-1/16 and 1-3/32 .....	404.0	30	94.3	71.9	118.6
1-1/8 and 1-5/32 .....	95.4	7	26.7	11.2	9.1
1-3/16 and longer .....	21.9	2	12.0	6.4	2.7
No staple <sup>4/</sup> .....	-	-	-	.2	-
All lengths .....	1,364.8	100	641.7	852.1	912.0

<sup>1/</sup> Estimate based on data obtained from cotton mills, adjusted for classification on official cotton standards.

<sup>2/</sup> Based on published reports of Agricultural Marketing Service.

<sup>3/</sup> Ginnings through November 30, 1940.

<sup>4/</sup> Includes bales for which, because of character defects, no specific length designation was assigned.

Tennessee cotton mills use principally cotton of the medium staple lengths -- 15/16 inch to 1-1/16 inches. More than 85 percent of consumption in that State falls within this range (table 9). Here the production of cotton of these staple lengths exceeds consumption. Although about 10 percent of the State's crop is 7/8 inch and shorter, its mills do not use this short cotton. About 5 percent of the cotton consumed in Tennessee mills in 1938-39 was 1-1/8-inch staple. During most recent years, the quantities of such cotton in the local crop have exceeded the requirements of Tennessee mills. Although almost 10 percent of the cotton used by local mills in 1938-39 consisted of cotton 1-3/16 inches and longer, only negligible quantities of cotton of this length of staple are produced in the State.

Most of the cotton-textile industry of the State of Tennessee is not located in cotton-producing areas. As a matter of fact, many of the mills are nearer the cotton-producing areas of other States than those of Tennessee.

Table 9. - Estimated consumption of cotton in Tennessee, by staple length, season 1938-39, in comparison with production, seasons 1938-39, 1939-40, and 1940-41

Staple length (inches)	Estimated consumption		Production <sup>2/</sup>		
	1938-39		1938-39	1939-40	1940-41
	<u>1/</u>				<u>3/</u>
	<u>1,000</u>	<u>Pct.</u>	<u>1,000</u>	<u>1,000</u>	<u>1,000</u>
	<u>bales</u>		<u>bales</u>	<u>bales</u>	<u>bales</u>
Shorter than 7/8 .....	-	-	17.9	12.9	7.4
7/8 and 29/32 .....	-	-	40.2	70.7	35.6
15/16 and 31/32 .....	28.3	17	134.4	135.5	62.1
1 and 1-1/32 .....	56.0	33	177.4	162.5	172.7
1-1/16 and 1-3/32 .....	61.7	36	93.3	46.4	132.3
1-1/8 and 1-5/32 .....	8.5	5	10.5	4.1	23.0
1-3/16 and longer .....	16.2	9	.1	.2	.9
No staple <u>4/</u> .....	-	-	-	.1	-
All lengths .....	170.7	100	473.8	432.4	434.0

<sup>1/</sup> Estimate based on data obtained from cotton mills, adjusted for classification on official cotton standards.

<sup>2/</sup> Based on published reports of Agricultural Marketing Service.

<sup>3/</sup> Ginnings through December 12, 1940.

<sup>4/</sup> Includes bales for which, because of character defects, no specific length designation was assigned.

Texas cotton mills, for the most part, consume cotton of 7/8-inch to 15/16-inch staple lengths. Almost 90 percent of the cotton used by mills in this State consists of such cotton (table 10). The supplies of cotton of these staple lengths in the Texas crop are enormous while consumption by local mills usually represents only about 5 percent of production. The proportion of the Texas crop classed as 7/8 inch and shorter has been reduced very materially, however, in the 1940-41 crop. Limited quantities of 1-inch to 1-1/8-inch cotton are used by Texas mills but represent only a small proportion of the cotton of these lengths produced in the State.

Table 10. - Estimated consumption of cotton in Texas, by staple length, season 1938-39, in comparison with production, seasons 1938-39, 1939-40, and 1940-41

Staple length (inches)	Estimated		Production <sup>2/</sup>		
	consumption				
	1938-39		1938-39	1939-40	1940-41
	<sup>1/</sup>				<sup>3/</sup>
	<u>1,000</u>	<u>Pct.</u>	<u>1,000</u>	<u>1,000</u>	<u>1,000</u>
	<u>bales</u>		<u>bales</u>	<u>bales</u>	<u>bales</u>
Shorter than 7/8 .....	-	-	288.8	453.2	139.5
7/8 and 29/32 .....	40.3	32	893.2	1,298.0	820.0
15/16 and 31/32 .....	69.7	56	1,183.0	600.8	1,210.1
1 and 1-1/32 .....	7.8	6	469.4	285.5	563.7
1-1/16 and 1-3/32 .....	3.2	3	109.0	92.7	105.4
1-1/8 and 1-5/32 .....	4.0	3	20.7	6.2	8.5
1-3/16 and longer .....	-	-	.1	-	<sup>4/</sup> 2.2
No staple <sup>5/</sup> .....	-	-	-	.4	-
All lengths .....	125.0	100	2,964.2	2,736.8	2,849.4

<sup>1/</sup> Estimate based on data obtained from cotton mills, adjusted for classification on official cotton standards.

<sup>2/</sup> Based on published reports of Agricultural Marketing Service.

<sup>3/</sup> Ginnings through November 30, 1940.

<sup>4/</sup> Includes American-Egyptian and sea-island cotton.

<sup>5/</sup> Includes bales for which, because of character defects, no specific length designation was assigned.

Virginia, although not one of the large cotton-manufacturing States, usually consumes several times as many bales of cotton as are produced within that State (table 11). Practically all the cotton consumed by Virginia mills consists of the staple lengths 15/16 inch to 1-1/16 inch, and the major part of the cotton produced within the State falls within this range. Limited quantities of cotton shorter than 15/16 inch are produced but it is not used by local mills.

Table 11. - Estimated consumption of cotton in Virginia, by staple length, season 1938-39, in comparison with production, seasons 1938-39, 1939-40, and 1940-41

Staple length (inches)	Estimated		Production <sup>2/</sup>		
	consumption				
	1938-39		1938-39	1939-40	1940-41
	<u>1/</u>				<u>3/</u>
	<u>1,000</u>	<u>Pct.</u>	<u>1,000</u>	<u>1,000</u>	<u>1,000</u>
	<u>bales</u>		<u>bales</u>	<u>bales</u>	<u>bales</u>
Shorter than 7/8 .....	-	-	-	0.1	-
7/8 and 29/32 .....	-	-	0.9	2.2	0.2
15/16 and 31/32 .....	7.8	6	5.8	5.7	.5
1 and 1-1/32 .....	108.7	78	4.0	2.2	6.0
1-1/16 and 1-3/32 .....	21.2	15	.4	.1	10.9
1-1/8 and 1-5/32 .....	-	-	-	-	1.5
1-3/16 and longer .....	1.6	1	-	-	<u>4/</u>
No staple <u>5/</u> .....	-	-	-	<u>4/</u>	.1
All lengths .....	139.3	100	11.1	10.3	19.2

<sup>1/</sup> Estimate based on data obtained from cotton mills, adjusted for classification on official cotton standards.

<sup>2/</sup> Based on published reports of Agricultural Marketing Service.

<sup>3/</sup> Ginnings through November 30, 1940.

<sup>4/</sup> Less than 100 bales.

<sup>5/</sup> Includes bales for which, because of character defects, no specific length designation was assigned.

# TRENDS IN STAPLE LENGTHS OF COTTON SUPPLIES AND IN PRICE DIFFERENTIALS

During the last decade, the production of cotton under cotton-improvement programs has increased steadily until it now represents a significant proportion of the total United States crop (table 12). This development has been accompanied by a very substantial increase in the production of cotton from 1 inch to 1-3/32 inches in staple length, with a corresponding decrease in some of the shorter staples. The trend in the proportions of available supplies of American cotton of staple lengths shorter than 15/16 inch has been downward particularly during the last few seasons (fig. 1). As shown previously, domestic consumption of cotton of these shorter staples likewise has decreased during recent years. The proportions of the available supplies of cotton that are 1-1/8 inches and longer have not changed materially but have tended to decline slightly.

Table 12. - Total cotton acreage and acreage under one-variety community program, seasons 1931-32 to 1940-41

Cotton season	:	Total cotton	:	One-variety program	
				Acreage	Percent of
				2/	total
		1/			acreage
		1,000 acres		1,000 acres	Percent
1931-32 .....	:	39,110	:	394	1
1932-33 .....	:	36,494	:	397	1
1933-34 .....	:	40,248	:	654	2
1934-35 .....	:	27,860	:	589	2
1935-36 .....	:	28,063	:	801	3
1936-37 .....	:	30,627	:	1,463	5
1937-38 .....	:	34,090	:	2,305	7
1938-39 .....	:	24,248	:	2,205	9
1939-40 .....	:	23,805	:	2,883	12
1940-41 3/ .....	:	24,406	:	4,188	17

1/ U. S. Crop Reporting Board.

2/ Bureau of Plant Industry.

3/ Preliminary.

Trends in available supplies of cotton of the various staple lengths are reflected in market price differentials for such staple lengths (fig. 2). The discounts for 13/16-inch and 7/8-inch cottons

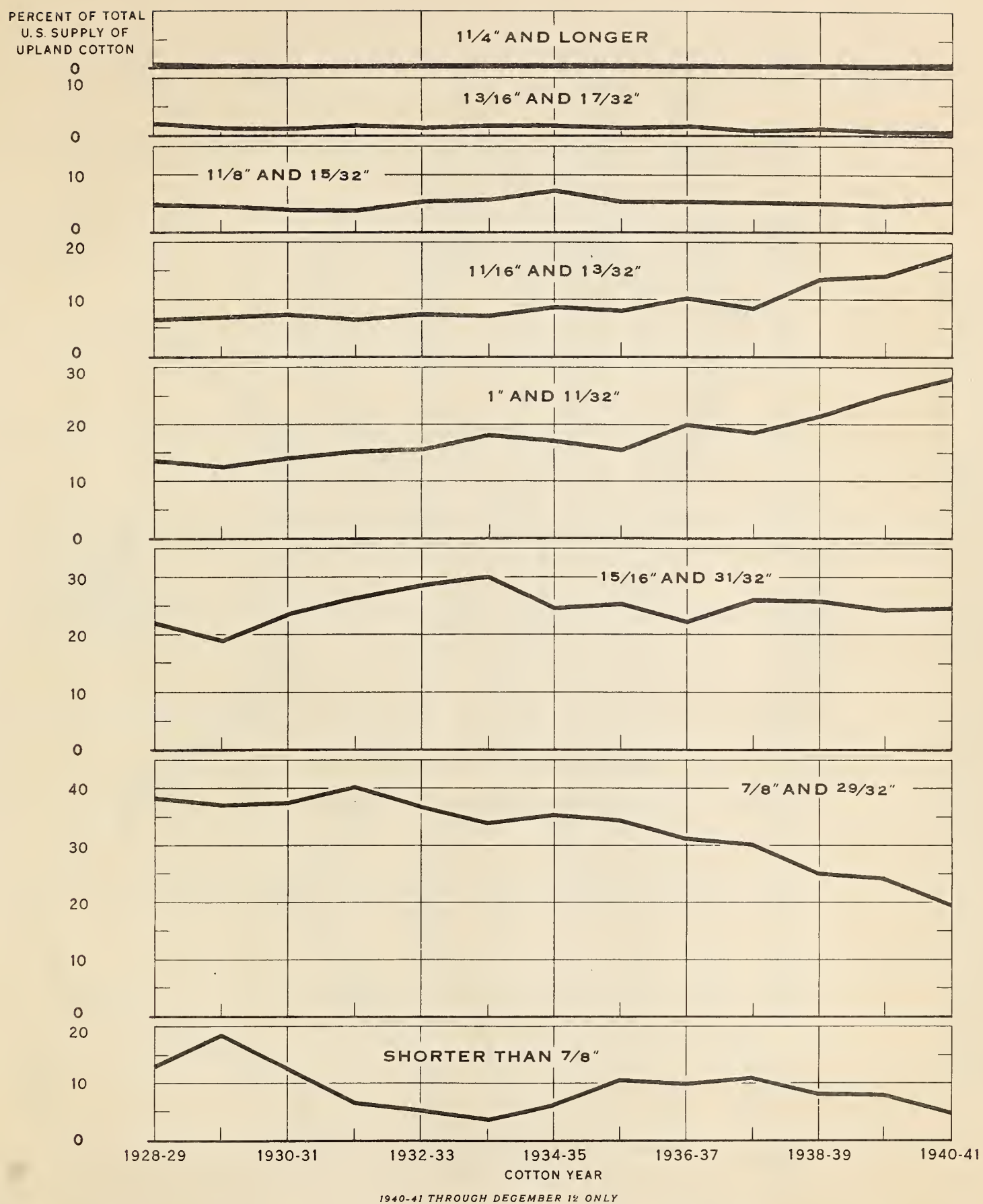


FIGURE 1. - Proportions of supplies of upland cotton in the United States represented by specified staple lengths, seasons 1928-29 to 1940-41 (1940-41 through December 12 only)



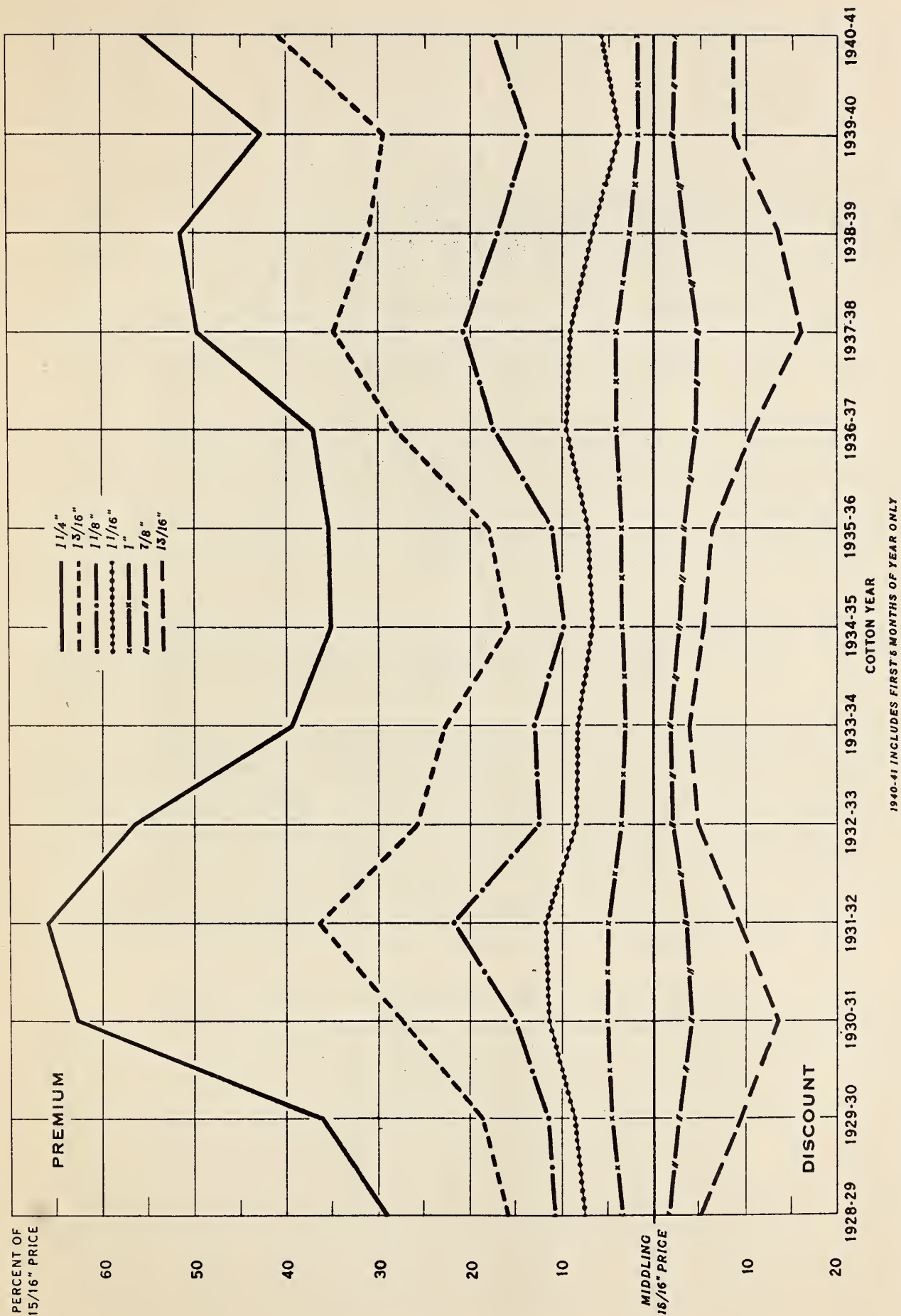


FIGURE 2. - Price differentials for cotton of specified staple lengths:  
 Percentage premium or discounts is of price of Middling 15/16-inch  
 cotton, seasons 1928-29 to 1940-41 (1940-41 through December only)



have tended to narrow in view of the reduced supplies of such cotton. Premiums for 1-inch cotton have declined considerably during the last few years as supplies of cotton of this staple length have increased. Similar trends are in evidence also for 1-1/16-inch cotton. For example, during the period 1928 to 1936, the premium for Middling 1-inch cotton over the Middling 15/16-inch price averaged 46 points. During the period 1937 to 1940, the premium has averaged only 24 points. Likewise, the premium for cotton 1-1/16 inches in staple length averaged 102 points during the period 1928 to 1936 but only 57 points during the period 1937 to 1940. These data refer, of course, to premiums prevailing in central cotton markets. In many instances, growers have not been able to obtain such premiums in selling cotton of these staple lengths in their local markets.

Apparently, the quality differentials established in connection with Government loans have tended to give cotton growers the benefit of price differences for quality to a greater extent than they have been able to realize when selling their cotton through customary marketing channels. This being the case, the loan program has given a decided impetus to the cotton-quality improvement program.

Premiums for cotton 1-1/8 inches and longer in staple have fluctuated within normal ranges over the last decade. Supplies of these staple lengths have decreased slightly.

Trends in available supplies and in premiums for cotton 1 inch to 1-1/16 inches in staple length are of considerable significance to the entire American cotton industry and particularly so from the standpoint of cotton growers. Although to date the supplies of cotton within this range in staple length are not excessive in relation to total available supplies, it appears likely that if the proportion of such cotton represented in total supply continues to increase, premiums for such cotton may be further reduced.

Most of the varieties now being planted under cotton-improvement programs have been developed to produce cotton averaging approximately 1 inch to 1-1/16 inches in staple length. Under normal conditions, the major portion of the cotton obtained from these varieties will staple from 1 inch to 1-3/32 inches. Under very favorable conditions, some of the cotton will perhaps staple as long as 1-1/8 inches; but under adverse conditions, a considerable proportion of the cotton obtained from them may be shorter than 1 inch. Although standardizing the production of cotton by gin communities has tended to provide cotton of more uniform staple length in such communities, in actual practice there is a significant range in the staple length of cotton obtained from a given variety during any given season in the same

community or, for that matter, on the same farm. This being the case, varieties selected for a staple length of 1-1/16 inches will, in actual practice, provide some cotton longer than this and some shorter.

It is reported that the improved varieties are providing very satisfactory yields and that for the most part, growers are well satisfied with them provided they can find market outlets for the cotton at satisfactory prices. It is apparent, however, that most growers are inclined to think of prices for this cotton in terms of present staple premiums or Government loan differentials. If premiums are further reduced by the pressure of increased supplies, it is not improbable that some growers may become dissatisfied with these varieties, unless they are convinced that they are obtaining better yields with them and that their net income is higher than it would be with the shorter varieties.

Although it is not possible under existing conditions of international trade, to make any satisfactory analysis of the situation with respect to trends in the staple length of cotton going to export markets, it is a well-known fact that our principal foreign market has been for cotton shorter than 1 inch in staple. The shorter staples have been used in foreign countries for the manufacture of relatively coarse fabrics which are used almost entirely for clothing by Europeans and Orientals, most of the latter having a comparatively low standard of living.

Possibly the exportation of cotton of longer staples would improve our competitive position with other countries because of the advantages of spinning such cotton. The possibility of obtaining premiums for better cotton, however, does not appear very promising because the relative cheapness of textile labor in foreign countries tends to offset any spinning-cost advantage to be gained by using cotton of longer staple.

In view of present trends in the production of cotton of staple lengths between 1 inch and 1-1/8 inches, it could logically be expected that the premiums for these staples ultimately may be equivalent only to the difference between the cost of processing such cotton and cotton of shorter staples plus any differences between the values of the manufactured goods. Data relative to the extent of these differences are not available.

## GEOGRAPHIC ORIGIN OF COTTON USED BY DOMESTIC MILLS

The sources of cotton used by individual cotton manufacturers are tending to become more localized as cotton production tends to become standardized by varieties in the various producing areas. This is particularly true in a number of localities in the Southeast where the cotton grown is suitable for the use of local mills. Growers who can produce cotton of the qualities desired by mills near them usually can obtain better prices for such cotton than for cotton for which an outlet must be found in distant markets.

The Southwestern States are the most important source of the cotton shorter than  $7/8$  inch in staple used by domestic mills (table 13). For cotton  $7/8$ -inch to 1-inch staple lengths, mills in the United States obtain the largest proportion of their supply from the Southeastern States. A substantial part of the 1-inch cotton, however, is obtained from the Mississippi Valley States, which are also the source of the major part of the cotton longer than 1 inch. About 75 percent of the cotton  $1-1/16$  inches in staple length, 90 percent of the  $1-1/8$  inches, and 85 percent of the  $1-3/16$  inches and longer is also obtained from these States. For cotton of all staple lengths used in mills of the United States during the season 1938-39, about 45 percent originated in the Mississippi Valley States, 40 percent in the Southeastern States, and 15 percent in the Southwestern States.

Almost three-fourths of the cotton consumed by mills in Alabama during the season 1938-39 was grown in that State and in the neighboring State of Georgia (table 14). The cotton shorter than  $7/8$  inch was obtained in about equal proportions from local sources, i. e., Alabama and Georgia, and from the Southwest. The major proportion of the cotton of the staples  $7/8$  inch to 1 inch, inclusive, consisted of local growths. On the other hand, most of the cotton  $1-1/16$  inches and longer was obtained from Mississippi Valley States.

Of the cotton of each of the staple lengths up to  $1-1/16$  inches used during the season 1938-39 by mills located in Georgia, about two-thirds was obtained from local sources (table 15). Most of the cotton  $1-1/16$  inches and longer was obtained from Mississippi Valley States. This is more particularly true for cotton  $1-1/8$  inches and longer. Although about two-thirds of the  $1-1/16$ -inch cotton was obtained from this region, substantial quantities of such cotton were obtained locally as well as from the Southwest and from the Carolinas.

Table 13. - Geographic origin of American cotton consumed by mills in the United States, by staple length, season 1938-39

Staple length of cotton consumed (inches)	Source of cotton consumed												
	Southeastern States						Miss. Valley States						All sources
	Ala., Ga., and Fla.	N. C., S. C., and Va.	Miss. Valley States	1,000 bales	Pct.	1,000 bales	Pct.	1,000 bales	Pct.	1,000 bales	Pct.		
Shorter than 7/8	17.5	33	3.6	7	2.4	4	30.1	56	53.6	100			
7/8 and 29/32	331.6	58	63.7	11	43.8	8	130.7	23	569.8	100			
15/16 and 31/32	683.3	39	268.0	15	357.1	21	427.5	25	1,735.9	100			
1 and 1-1/32	530.8	24	471.2	22	881.6	41	284.3	13	2,167.9	100			
1-1/16 and 1-3/32	58.5	4	170.3	11	1,111.1	75	146.0	10	1,485.9	100			
1-1/8 and 1-5/32	.8	1/	23.9	5	423.0	92	15.4	3	463.1	100			
1-3/16 and longer 2/	3.4	1	15.9	6	219.0	85	21.6	8	259.9	100			
All lengths	1,625.9	24	1,016.6	15	3,038.0	45	1,055.6	16	6,736.1	100			

Data based on a survey of American cotton mills.

1/ Less than 0.5 percent.

2/ Includes American-Egyptian and sea-island cottons.

Table 14. - Geographic origin of American cotton consumed by mills in Alabama, by staple length, season 1938-39

Staple length of cotton consumed (inches)	Source of cotton consumed									
	Southeastern States		Miss. Valley		Southwestern States		All sources			
	Ala., Ga., and Fla.	N. C., S. C., and Va.	Ala., Ga., and Fla.	N. C., S. C., and Va.	Ala., Ga., and Fla.	N. C., S. C., and Va.	1,000 bales	Pct.	1,000 bales	Pct.
Shorter than 7/8	6.4	52	-	-	0.3	2	5.7	46	12.4	100
7/8 and 29/32	105.6	86	-	-	4.3	3	13.0	11	122.9	100
15/16 and 31/32	252.1	93	-	-	16.1	6	3.8	1	272.0	100
1 and 1-1/32	141.8	91	-	-	13.8	9	-	-	155.6	100
1-1/16 and 1-3/32	22.4	16	-	-	92.9	65	28.0	19	143.3	100
1-1/8 and 1-5/32	.6	17	-	-	3.1	83	-	-	3.7	100
1-3/16 and longer	-	-	-	-	15.4	100	-	-	15.4	100
All lengths	528.9	73	-	-	145.9	20	50.5	7	725.3	100

Data based on a survey of American cotton mills.

Table 15. - Geographic origin of American cotton consumed by mills in Georgia, by staple length, season 1938-39

Staple length of cotton consumed (inches)	Source of cotton consumed							
	Southeastern States				Miss. Valley States			
	Ala., Ga., and Fla.	N. C., S. C., and Va.	Miss. Valley States	Southwestern States	All sources			
	1,000 : Pct. : 1,000 : Pct. : 1,000 : Pct. : 1,000 : Pct. : 1,000 : Pct.							
	bales :	bales :	bales :	bales :	bales :	bales :	bales :	bales :
Shorter than 7/8 .....	11.2 :	64 :	- :	2.1 :	12 :	4.2 :	24 :	17.5 :
7/8 and 29/32 .....	193.5 :	70 :	30.5 :	11 :	22.5 :	8 :	31.1 :	11 :
15/16 and 31/32 .....	243.2 :	65 :	3.6 :	1 :	60.9 :	17 :	58.4 :	16 :
1 and 1-1/32 .....	255.6 :	68 :	11.0 :	3 :	77.9 :	20 :	32.7 :	9 :
1-1/16 and 1-3/32 .....	28.8 :	12 :	15.2 :	6 :	161.2 :	66 :	38.2 :	16 :
1-1/8 and 1-5/32 .....	- :	- :	.3 :	1 :	18.6 :	99 :	- :	- :
1-3/16 and longer .....	- :	- :	3.5 :	10 :	32.3 :	90 :	- :	- :
All lengths .....	733.3 :	55 :	64.1 :	5 :	375.5 :	28 :	164.6 :	12 :
								1,337.5 :

Data based on a survey of American cotton mills.

Cotton of all the staple lengths consumed by mills in Mississippi during the season 1938-39 was obtained locally except for a limited quantity of 1-inch staple which was obtained from nearby areas in Alabama (table 16).

About one-third of the cotton consumed by mills in North Carolina during the season 1938-39 was produced in that State and in the neighboring States of South Carolina and Virginia (table 17). A considerably larger proportion was obtained from Mississippi Valley States. More than 10 percent of the total was obtained from Alabama, Georgia, and Florida, and about the same proportion was obtained from Southwestern States. Although cotton of most of the staple lengths was obtained from local sources, such sources were drawn upon primarily for 15/16 to 1-inch staples. Substantial quantities of cotton of 7/8-inch to 1-inch staples were drawn from Alabama and Georgia. The Mississippi Valley States were the principal source of cotton 1-1/16 inches and longer. Except for the limited quantities of long staple American-Egyptian cotton from Arizona, most of the cotton obtained from the Southwest was 1 inch and shorter in staple length.

Only about one-fourth of the cotton consumed by South Carolina mills during the 1938-39 season was grown in the Carolinas (table 18). More than one-half was obtained from the Mississippi Valley States. The remainder was drawn in approximately equal proportions from the Georgia, Alabama, Florida area and from the Southwest. Practically all the 7/8-inch cotton was obtained from the Southeastern States. The 15/16-inch cotton, on the other hand, was drawn in substantial quantities from each of the major cotton-producing regions of the United States. The same is true for cotton of 1-inch staple except that more than one-half of the total came from the Mississippi Valley States. The major portion of the cotton 1-1/16 inches and longer likewise was obtained from the Mississippi Valley States. A considerable part of the cotton 1-3/16 inches and longer used by South Carolina mills was produced within the State. Long staple American-Egyptian and sea-island cottons were used to some extent.

Approximately 85 percent of the cotton consumed during the season 1938-39 by mills in Tennessee was obtained from the Mississippi Valley States (table 19). This area was the principal source of cotton of all staple lengths except 15/16 inch. The major portion of the cotton of this staple length was obtained from Alabama and Georgia.

Cotton consumed by mills in Texas consists entirely of local growths and ranges from 7/8 inch to 1-1/8 inches in staple length (table 20).

Table 16. - Geographic origin of American cotton consumed by mills in Mississippi, by staple length, season 1938-39

Staple length of cotton consumed (inches)	Source of cotton consumed										All sources
	Southeastern States				Miss. Valley States		Southwestern States		1,000 bales	Pct.	
	Ala., Ga., and Fla.	N. C., S. C., and Va.	1,000 bales	Pct.	1,000 bales	Pct.	1,000 bales	Pct.			
Shorter than 7/8 .....	-	-	-	-	-	-	-	-	-	-	-
7/8 and 29/32 .....	-	-	-	-	6.5	100	-	-	6.5	100	100
15/16 and 31/32 .....	-	-	-	-	6.7	100	-	-	6.7	100	100
1 and 1-1/32 .....	5.2	25	-	-	16.0	75	-	-	21.2	100	100
1-1/16 and 1-3/32 .....	-	-	-	-	5.2	100	-	-	5.2	100	100
1-1/8 and 1-5/32 .....	-	-	-	-	-	-	-	-	-	-	-
1-3/16 and longer .....	-	-	-	-	-	-	-	-	-	-	-
All lengths .....	5.2	13	-	-	34.4	87	-	-	39.6	100	100

Data based on a survey of American cotton mills.

Table 17. - Geographic origin of American cotton consumed by mills in North Carolina, by staple length, season 1938-39

Staple length of cotton consumed (inches)	Source of cotton consumed												
	Southeastern States				Miss. Valley States				Southwestern States				All sources
	Ala., Ga., and Fla.	N. C., S. C., and Va.			Ala., Ga., and Fla.	N. C., S. C., and Va.			Ala., Ga., and Fla.	N. C., S. C., and Va.			All sources
	<u>1,000 bales</u>	<u>Pct.</u>	<u>1,000 bales</u>	<u>Pct.</u>	<u>1,000 bales</u>	<u>Pct.</u>	<u>1,000 bales</u>	<u>Pct.</u>	<u>1,000 bales</u>	<u>Pct.</u>	<u>1,000 bales</u>	<u>Pct.</u>	
Shorter than 7/8 .....	-	-	3.6	100	-	-	-	-	-	-	-	-	3.6: 100
7/8 and 29/32 .....	3.2	11	14.1	50	6.3	22	5.0	17	28.6	100			
15/16 and 31/32 .....	125.4	22	217.4	39	132.1	23	91.9	16	566.8	100			
1 and 1-1/32 .....	65.1	10	277.2	42	212.8	33	97.1	15	652.2	100			
1-1/16 and 1-3/32 .....	1.0	1/	64.2	20	235.2	75	16.0	5	316.4	100			
1-1/8 and 1-5/32 .....	-	-	12.9	11	99.5	89	-	-	112.4	100			
1-3/16 and longer 2/ .....	2.3	3	6.3	8	60.3	80	6.8	9	75.7	100			
All lengths .....	197.0	11	595.7	34	746.2	43	216.8	12	1,755.7	100			

Data based on a survey of American cotton mills.

1/ Less than 0.5 percent.

2/ Includes American-Egyptian and sea-island cottons.

Table 18. - Geographic origin of American cotton consumed by mills in South Carolina, by staple length, season 1938-39

Staple length of cotton consumed (inches)	Source of cotton consumed										All sources
	Southeastern States				Miss. Valley		Southwestern States		All sources		
	Ala., Ga., and Fla.	N. C., S. C., and Va.	States	Miss. Valley	States	States	States				
	1,000 : Pct. : 1,000 : Pct. : 1,000 : Pct. : 1,000 : Pct. : 1,000 : Pct. : 1,000 : Pct.										
	bales :	bales :	bales :	bales :	bales :	bales :	bales :	bales :	bales :	bales :	
Shorter than 7/8	-	-	-	-	-	-	-	-	-	-	
7/8 and 29/32	22.3 :	49 :	19.1 :	42 :	3.9 :	9 :	1/ :	2/ :	45.3 :	100	
15/16 and 31/32	46.5 :	20 :	46.3 :	20 :	93.3 :	40 :	48.1 :	20 :	234.2 :	100	
1 and 1-1/32	59.7 :	11 :	158.4 :	28 :	290.8 :	51 :	55.1 :	10 :	564.0 :	100	
1-1/16 and 1-3/32	2.2 :	1 :	90.8 :	22 :	298.6 :	74 :	12.4 :	3 :	404.0 :	100	
1-1/8 and 1-5/32	.2 :	2/ :	10.7 :	11 :	83.2 :	87 :	1.3 :	2 :	95.4 :	100	
1-3/16 and longer 3/	-	-	6.0 :	28 :	13.0 :	59 :	2.9 :	13 :	21.9 :	100	
All lengths	130.9 :	10 :	331.3 :	24 :	782.8 :	57 :	119.8 :	9:1,364.8 :	100	100	

Data based on a survey of American cotton mills.

1/ Less than 100 bales.

2/ Less than 0.5 percent.

3/ Includes American-Egyptian cotton.

Table 19. - Geographic origin of American cotton consumed by mills in Tennessee, by staple length, season 1938-39

Staple length of cotton consumed (inches)	Source of cotton consumed									
	Southeastern States		Miss. Valley		Southwestern States		All sources			
	Ala., Ga., N. C., S. C., and Fla.	and Va.	Ala., Ga., N. C., S. C., and Fla.	and Va.	Ala., Ga., N. C., S. C., and Fla.	and Va.	Ala., Ga., N. C., S. C., and Fla.	and Va.	Ala., Ga., N. C., S. C., and Fla.	and Va.
	1,000 bales	Pct.	1,000 bales	Pct.	1,000 bales	Pct.	1,000 bales	Pct.	1,000 bales	Pct.
Shorter than 7/8	-	-	-	-	-	-	-	-	-	-
7/8 and 29/32	-	-	-	-	-	-	-	-	-	-
15/16 and 31/32	16.0	57	-	-	12.3	43	-	-	28.3	100
1 and 1-1/32	2.0	4	1.0	2	53.0	94	-	-	56.0	100
1-1/16 and 1-3/32	4.4	7	-	-	55.3	90	2.0	3	61.7	100
1-1/8 and 1-5/32	-	-	-	-	8.5	100	-	-	8.5	100
1-3/16 and longer	-	-	-	-	16.2	100	-	-	16.2	100
All lengths	22.4	13	1.0	1	145.3	85	2.0	1	170.7	100

Data based on a survey of American cotton mills.

Table 20. - Geographic origin of American cotton consumed  
by mills in Texas, by staple length, season 1938-39

Staple length of cotton consumed (inches)	Source of cotton consumed							
	Southeastern States				Miss. Valley States			
	Ala., Ga., and Fla.	N. C., S. C., and Va.	bales	Pct.	Ala., Ga., and Fla.	N. C., S. C., and Va.	bales	Pct.
	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Shorter than 7/8	-	-	-	-	-	-	-	-
7/8 and 29/32	-	-	-	-	-	-	40.3	100
15/16 and 31/32	-	-	-	-	-	-	69.7	100
1 and 1-1/32	-	-	-	-	-	-	7.8	100
1-1/16 and 1-3/32	-	-	-	-	-	-	3.2	100
1-1/8 and 1-5/32	-	-	-	-	-	-	4.0	100
1-3/16 and longer	-	-	-	-	-	-	-	-
All lengths	-	-	-	-	-	-	125.0	100

Data based on a survey of American cotton mills.

The cotton-textile industry of Virginia obtains more than 70 percent of its raw cotton from the Mississippi Valley States (table 21). All the cotton obtained from this source is 1 inch and longer in staple. A substantial proportion of the 1-inch staple is obtained from nearby producing areas. All the cotton shorter than 1 inch is obtained from the Southwestern States.

Cotton consumed by mills located in non-cotton-producing States, principally in the New England States, is obtained from all parts of the Cotton Belt. About two-thirds of it, consisting principally of cotton 1 inch and longer in staple, is produced in the Mississippi Valley States (table 22). Only 1 percent of the total supply is obtained from the Southeastern States. This consists almost exclusively of short staple cotton from Alabama and Georgia and long staple sea-island cotton from Georgia and Florida. All the cotton shorter than  $7/8$  inch used by northern mills is obtained from the Southwestern States. As a matter of fact, the major portion of the cotton shorter than 1 inch comes from this producing region. New England mills obtain their supply of long staple American-Egyptian cotton from the same source.

#### FACTORS DETERMINING QUALITY OF COTTON USED BY MILLS

Chief among the factors determining the quality of cotton used by a mill are: (1) the product or products manufactured, (2) relative prices of cotton of various staple lengths, and (3) the type of mill equipment used.

These factors singly or in combination determine the degree or limits of flexibility in the quality of cotton that can be used successfully from the technological and economic standpoints. As this report is not concerned primarily with the grade factor of quality, the scope of this phase of the analysis will be limited to the staple length and, to an incidental extent, to the character elements of cotton quality.

##### Products Manufactured

The staple length of cotton used for a given produce will depend primarily upon the yarn count, the strength, and other specifications desired in the yarn. Under customary manufacturing procedures, the staple length used for the various yarn counts in fabrics for

Table 21. - Geographic origin of American cotton consumed by mills in Virginia, by staple length, season 1938-39

Staple length of cotton consumed (inches)	Source of cotton consumed									
	Southeastern States		Miss. Valley States		Southwestern States		All sources			
	Ala., Ga. and Fla.	N. C., S. C. and Va.	Ala., Ga. and Fla.	N. C., S. C. and Va.	Miss. Valley States	Southwestern States	Ala., Ga. and Fla.	N. C., S. C. and Va.	Miss. Valley States	Southwestern States
	1,000 : Pct. : bales	1,000 : Pct. : bales	1,000 : Pct. : bales	1,000 : Pct. : bales	1,000 : Pct. : bales	1,000 : Pct. : bales	1,000 : Pct. : bales	1,000 : Pct. : bales	1,000 : Pct. : bales	1,000 : Pct. : bales
Shorter than 7/8 .....	-	-	-	-	-	-	-	-	-	-
7/8 and 29/32 .....	-	-	-	-	-	-	-	-	-	-
15/16 and 31/32 .....	-	-	-	-	-	7.8: 100:	-	-	-	7.8: 100:
1 and 1-1/32 .....	-	23.7: 22:	77.2: 71:	7.8: 7:	108.7: 100:	-	-	-	-	-
1-1/16 and 1-3/32 .....	-	-	21.2: 100:	-	-	-	-	-	-	21.2: 100:
1-1/8 and 1-5/32 .....	-	-	-	-	-	-	-	-	-	-
1-3/16 and longer .....	-	-	1.6: 100:	-	-	-	-	-	-	1.6: 100:
All lengths .....	-	23.7: 17:	100.0: 72:	15.6: 11:	139.3: 100:	-	-	-	-	-

Data based on a survey of American cotton mills.

Table 22. - Geographic origin of American cotton consumed by mills in non-cotton-producing States, by staple length, season 1938-39

Staple length of cotton consumed (inches)	Source of cotton consumed									
	Southeastern States		Miss. Valley		Southwestern States		All sources			
	Ala., Ga., and Fla.	N. C., S. C., and Va.	Ala., Ga., and Fla.	N. C., S. C., and Va.	Ala., Ga., and Fla.	N. C., S. C., and Va.	Ala., Ga., and Fla.	N. C., S. C., and Va.	Ala., Ga., and Fla.	N. C., S. C., and Va.
	1,000 : Pct. : 1,000 : Pct. : 1,000 : Pct. : 1,000 : Pct. : 1,000 : Pct. : 1,000 : Pct. : 1,000 : Pct.	bales : : bales : : bales : : bales : : bales : : bales : : bales : : bales : : bales : : bales : :								
Shorter than 7/8	-	-	-	-	-	-	20.2	100	20.2	100
7/8 and 29/32	7.0	14	-	-	0.3	1	41.3	85	48.6	100
15/16 and 31/32	-	-	0.8	1	35.6	21	127.7	78	164.1	100
1 and 1-1/32	4	1	-	-	74.4	49	76.0	51	150.8	100
1-1/16 and 1-3/32	-	-	-	-	241.5	89	30.9	11	272.4	100
1-1/8 and 1-5/32	-	-	-	-	210.1	95	10.1	5	220.2	100
1-3/16 and longer 2/	9	1	-	-	80.5	86	11.8	13	93.2	100
All lengths	8.3	1	8	1	642.4	66	318.0	33	969.5	100

Data based on a survey of American cotton mills.

1/ Less than 0.5 percent.

2/ Includes American-Egyptian and sea-island cottons.

clothing and household use are as indicated in table 23. The range in yarn counts customarily spun from each of the staple lengths apply primarily to warp yarns for products that do not require special twist, strength, or other unusual qualities. The range in counts for filling yarns would be somewhat broader.

Table 23. - Approximate maximum yarn counts for warp yarns spun from cotton of specified staple lengths 1/

Staple length of cotton (inches) :	Approximate maximum yarn count
7/8 .....	16 <sup>s</sup>
29/32 .....	20 <sup>s</sup>
15/16 .....	24 <sup>s</sup>
31/32 .....	28 <sup>s</sup>
1 .....	32 <sup>s</sup>
1-1/32 .....	36 <sup>s</sup>
1-1/16 .....	40 <sup>s</sup>
1-3/32 .....	44 <sup>s</sup>
1-1/8 .....	50 <sup>s</sup>
1-3/16 to 1-1/4 .....	60 <sup>s</sup>

1/ Applies to yarns for products not requiring special twist, strength, or other unusual qualities.

Warp yarns must meet rigid strength requirements because of the strain to which they are subjected during the weaving process. Filling yarns, on the other hand, are not required to meet any unusual stress or strain and can be spun into finer counts. For some products, however, filling yarns are coarser than warp yarns. It is possible, of course, to make the coarser yarns from cotton of the longer staples, and this is done in special cases.

For the important group of cotton products generally referred to as mechanical fabrics or special fabrics, strength and durability are of primary consideration. These products, consisting of such items as tire fabric, sewing thread, airplane fabric, balloon fabric, fire hose, belting, duck, typewriter ribbon, and many others, must meet rather exacting service requirements. The strength and durability required are attained by the use of cotton of longer staple than would otherwise be used for yarns of the same count. For example, tire

fabrics, which occupy the most important place in this group, are usually made from yarns ranging from 10<sup>S</sup> to 22<sup>S</sup>. Yarns in this range could easily be made from cotton shorter than 1 inch. Since, however, tire fabrics are required to meet severe service tests, manufacturers find it necessary to use cotton 1 inch to 1-1/16 inches in staple length for tires for light-weight cars, 1-1/8 inches and longer for tires for medium-weight cars, and 1-1/4 to 1-1/2 inches for heavy-duty tires for buses and trucks.

For the general run of cotton products, the coarser and cheaper yarns and fabrics are produced from the short staples, whereas the finer yarns and fabrics require the use of the longer staples. From the standpoint of staple lengths required or customarily used, cotton products may be divided into four rather broad groups as follows:

1. Products manufactured from cotton 7/8 inch and shorter in staple. Some of the more important items in this group, from the standpoint of quantities of cotton used, are cotton blankets, absorbent cotton, cordage and twine, mop yarn, batting and wadding, and cotton felts. With the exception of blankets and absorbent cotton, these items are made also from cotton waste.

2. Products manufactured from cotton 7/8 inch to 1-1/32 inches in staple length. Among the products in this group are denims, ducks, drills, osnaburgs, print cloth, sheetings, towelings, flannels, gingham, curtains, tire fabrics for light-weight cars, and many others. Products made from cotton within this range in staple length constitute the most important group of cotton products.

3. Products manufactured from cotton 1-1/16 to 1-3/16 inches in staple length. Some of the principal products in this group are tire fabrics, broadcloth, the better grades of sheetings, thread, sateens, and many of the other better-grade fabrics for clothing, household, and industrial uses. Because of the lighter weight and finer yarns used in these products or because of special strength requirements, it is necessary to use cotton of longer staple than that required for products in the previous groups.

4. Products manufactured from cotton 1-1/4 inches and longer in staple. Some of the products in this group are thread, airplane fabrics, bus and truck tire fabrics, organdies and voiles, lawns, muslins, pongees, and many other fine fabrics or products with unusual strength requirements. This group represents the finest and most expensive products manufactured from cotton.

These four groups of cotton products, for which raw cotton of the various staple-length groups are used, represent a rather arbitrary grouping but one which is applicable under most circumstances. As there are many grades of each of the products mentioned, there is naturally considerable overlapping in the staple-length groups.

During recent years distributors of cotton goods have shown a pronounced tendency to insist that mills supply them with goods of better quality. This probably reflects competition of other fibers as well as a greater degree of quality consciousness on the part of consumers. In order to supply goods of the quality desired, cotton manufacturers have found it necessary, in many instances, to use cotton of longer staple than formerly had been used for these same products. Apparently, this trend has reduced the demand in the domestic market for short staple cotton (7/8 inch and shorter) and has resulted in a corresponding increase in demand for the longer staples. The fact that emphasis upon quality in consumer goods made of cotton has developed simultaneously with increases in the supplies of the longer staples that have resulted from the cotton-improvement programs, has tended to accelerate the adjustment to the longer staples because of their availability at reduced premiums.

#### Mill Equipment

The equipment used in a mill may have a very definite bearing on the staple length of the cotton used for the products being manufactured. For "regular draft" equipment, mechanical adjustments are necessary, especially on the drawing, roving, and spinning frames, before a mill can change from cotton of one staple length to cotton of another staple length. For example, in changing to a longer staple, it is necessary to spread the attenuating (drafting) rolls farther apart so as to manipulate the longer fiber. If this were not done the use of the longer cotton would result in the production of so-called corkscrew or cockled yarn of inferior quality and value. On the other hand, the use of cotton of shorter staple would result in increased waste and an inferior and more irregular quality of yarn. The mechanical adjustments necessary to change to a different staple length are somewhat expensive and usually will be made for the manufacture of a given product only on what is believed to be a fairly permanent basis.

The American cotton-textile industry has made substantial progress in recent years in changing from "regular draft" equipment

to equipment involving the "long draft" principle (table 24). The use of such equipment tends to facilitate the handling of cotton of greater variation in staple length and as a result permits somewhat greater flexibility in the staple length of cotton used.

Table 24. - Percent of cotton spindles in place employing long draft and regular draft in specified States

State	Draft	
	Long	Regular
	Percent	Percent
Alabama .....	68	32
Georgia .....	71	29
North Carolina .....	44	56
South Carolina .....	51	49
Tennessee .....	53	47
Texas .....	36	64
New England States .....	23	77
Other .....	38	62
Total .....	46	54

Source of data: Cotton, June 1940, pp. 60-62.  
American Wool and Cotton Reporter, August 1, 1940,  
p. 39.

Although long-draft equipment was designed originally to permit the use of short staple and cheaper cotton while at the same time maintaining the quality of the yarn produced, later developments have tended in the opposite direction. Manufacturers have found that the use of longer staple cotton with such equipment enables them to eliminate certain processes and thereby increase production and otherwise effect manufacturing economies.

There also has been a recent trend toward high-speed textile machinery. This is true particularly with respect to pickers, drawing, roving, and spinning frames, spoolers, warpers, slashers, and looms. The effective use of this equipment requires cotton of good quality.

The trend toward higher cost of manufacture because of shorter hours, higher wages, and similar developments apparently has tended to stimulate cotton manufacturers to develop offsetting economies. These economies have been made possible by the use of the new types of equipment and by the use of better cotton so as to eliminate certain processes and accelerate production.

#### Relative Prices of Various Qualities

Prices of cotton of the various grades usually have varied directly with staple length. The premiums paid for the longer staples have been the result primarily of the relative scarcity of such cotton, attributable to higher production costs <sup>2/</sup>, and to the necessity for using such cotton for certain types of products. Manufacturers of the finer yarns and fabrics or of products for which special strength requirements have to be met, have found it necessary to use the longer staples and to pay prevailing premiums in order to obtain the supplies needed.

Competition in the cotton-textile industry is such that a cotton manufacturer, to be successful from a financial standpoint, must obtain his raw cotton at the lowest possible cost consistent with efficient processing and with the quality required in the manufactured product. In view of customary premiums for the longer staples, manufacturers have an incentive to use cotton of the shortest staple that will give them satisfactory results from the standpoint of processing costs and quality of product.

As a general rule, the manufacturing processes can be performed somewhat more efficiently as the staple length of the cotton used is increased, provided grade and such elements of character as fiber fineness, strength, and uniformity remain the same. In view of this fact, some manufacturers follow the practice of using cotton of staples somewhat longer than actually needed for obtaining the quality required in the product, on the theory that lower costs of manufacture will offset the higher cost of raw cotton.

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<sup>2/</sup> Some of the improved varieties now being grown extensively are reported to produce yields exceeding those of the shorter staple varieties thus making their cost of production per pound of lint compare favorably with that of cotton of shorter staple.

From the standpoint of relative prices of cotton of various staple lengths, the basic principle upon which cotton manufacturers determine the staple length of the cotton to be used for a given product is that of approximating an optimum length for that particular purpose. The optimum staple length in any given case is one so adapted to the production of the product that if a shorter staple were used, increased manufacturing costs would more than offset the decreased cost of cotton, or if a longer staple were used, the increased cost of raw cotton would more than counterbalance the reduction in manufacturing costs. <sup>3/</sup> Obviously, the determination and consistent use of the precise optimum staple length for a given product perhaps is seldom realized in actual practice because of the frequent variations in staple premiums as well as in the other factors involved.

Once the production of a mill is organized satisfactorily, the management is reluctant to make changes in the quality of raw cotton used, since such changes usually necessitate the resetting of machinery and often result temporarily in unsatisfactory production while the mill operatives are becoming accustomed to the new type of cotton. Furthermore, when a change to a different cotton results in improvement in the quality of the manufactured product, customers insist on the maintenance of that quality. Under such circumstances, changes are made only when there is prospect of continuing the use of the new type of cotton on a relatively permanent basis.

#### MEANS EMPLOYED BY COTTON MILLS FOR SPECIFYING QUALITY REQUIREMENTS

Approximately 84 percent of all domestic mill purchases of raw cotton during the season 1938-39 were described for grade in terms of the Official Cotton Standards of the United States (table 25). Of the remainder, 15 percent were based on private types and 1 percent was purchased on actual samples. It should be understood, of course, that although a mill in making purchases of raw cotton may designate certain qualities as represented by the official cotton standards, or by private types, the cotton may be approved on actual samples.

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<sup>3/</sup> Whitaker, Rodney, Trends in the Quality of Cotton Consumed. Bureau of Agricultural Economics, January 1935, pp. 1-13 (mimeographed).

Table 25. - Percentage of raw cotton purchased by domestic manufacturers under specified methods for indicating quality, season 1938-39

Quality basis of purchase	Grade	Staple
	Percent	Percent
Official Cotton Standards .....	84	78
Private types .....	15	21
Actual samples .....	1	1
Total .....	100	100

Data based on a survey of domestic cotton mills.

Mills use the official standards for staple length somewhat less extensively than the standards for grade as a basis for describing their purchases of cotton. Approximately 78 percent of all domestic mill purchases during the season 1938-39 were described for staple length in terms of the official standards, 21 percent were based on private types, and 1 percent on actual samples.

These data indicate that there has been a substantial increase in the use of the official cotton standards by domestic mills during recent years. In 1930-31, 68 percent of the purchases were described in terms of the official standards for grade and 48 percent in terms of the standards for staple length. 4/

About 2 percent of the mills in the United States use variety as a supplementary means for obtaining cotton of the character desired. As a general rule, manufacturers have not found it practicable to use variety as the sole means of obtaining cotton of the quality or qualities desired. This is because of the wide range in grades as well as in staple lengths obtained in actual practice even from the improved varieties. For this reason, mills purchasing cotton from areas where production has been standardized from the standpoint of a single variety, limit their purchases to the special grades and staple lengths desired. In this manner, purchase according to variety is used as a means of supplementing commercial classification in order to obtain

4/ Wright, J. W., The Use of the Official Cotton Standards of the United States (In Sales to Domestic Mills). Bureau of Agricultural Economics, December 1934, p. 7 (multigraphed report).

fiber of the character desired. In the absence of official standards for character, this procedure in purchasing appears to have definite advantages which will be enhanced, no doubt, as the standardization of production by variety becomes a more general practice in various producing areas.

Although a mill may not actually specify variety in its purchases, the specification of locality of growth or the requirement for matching a special type for staple length and character, frequently is, in actual practice, essentially the same thing as a purchase by variety. This may be because only one variety is grown in the locality specified or because only a given variety will provide cotton of the exact type specified. In such instances, however, the mill may not be aware of the particular variety being obtained.

Some cotton manufacturers who buy cotton produced in their immediate vicinity make a practice of purchasing, regardless of grade and staple, all cotton of certain varieties offered to them for sale. If the mill cannot use the entire range in qualities thus obtained, the cotton is classed out and qualities not used by the mill are disposed of to other mills or to the cotton trade. In such instance, the mill usually adjusts its buying price to make allowance for the extra trouble of merchandising the cotton not suitable for its own use. For the most part, cotton mills are not organized to perform this service and prefer to restrict their purchases to the specific qualities used.

#### SUMMARY AND CONCLUSIONS

The program for the improvement of American cotton sponsored by the Department and other agencies has now developed to a point where it is having a significant effect upon the quality of the cotton crop. As a basis for the further development of the program and for coordinating cotton production with mill requirements and preferences from the standpoint of quality, information is needed with respect to the quantities of the various qualities of cotton consumed.

Data relative to quantities and qualities of cotton consumed by domestic mills during the season 1938-39, the place of growth of the cotton, and related information were obtained from a representative cross section of the domestic cotton-manufacturing industry. The data were adjusted in terms of the Official Cotton Standards of the United States on the basis of the classification of samples of cotton being used by domestic mills for the manufacture of specific types of cotton goods.

Although cotton consumed by domestic mills includes a wide range in staple lengths, about 88 percent of the consumption of American-grown cotton is within the range of  $7/8$  inch to  $1-3/32$  inches. About 11 percent is  $1-1/8$  inches and longer and less than 1 percent is shorter than  $7/8$  inch.

With the exception of cotton  $1-1/8$  inches and longer in staple and the very short cotton now obtained from the Orient, there are ample quantities of all staple lengths available in the American crop to meet the requirements of the domestic cotton-textile industry. Only about 10 percent of the cotton shorter than  $7/8$  inch produced in the United States is consumed by domestic mills. About one-third of the  $7/8$ -inch cotton is used in this country. For cotton  $15/16$  inch and longer, the major part of the American crop is consumed by domestic mills.

The shift to the production of cotton of longer staple apparently has proved quite generally advantageous to the United States cotton industry. In some instances, however, this shift has, for some mills, increased the difficulty of obtaining locally cotton shorter than 1 inch which they prefer for the products they manufacture.

Trends in available supplies of cotton of the various staple lengths are reflected in market price differentials for such staple lengths. Discounts for  $13/16$ -inch and  $7/8$ -inch cotton have tended to narrow in view of reduced supplies of cotton of these staple lengths. Premiums for 1-inch and  $1-1/16$ -inch cotton have declined as supplies of cotton of these staple lengths have increased. Premiums for cotton  $1-1/8$  inches and longer have fluctuated within normal ranges. Supplies of these staple lengths have decreased slightly.

In view of present trends in the production of cotton of staple lengths between 1 inch and  $1-1/8$  inches, it is not improbable that the premiums for these staples may further decline to a point where they are equivalent only to the difference between the cost of processing such cotton and cotton of shorter staple plus any difference between the values of the manufactured goods.

The sources of cotton used by individual mills are tending to become more localized as cotton production tends to become standardized by varieties in the various producing areas. The Southwestern States are the most important source of cotton shorter than  $7/8$  inch in staple used by domestic mills. In the case of  $7/8$ -inch to 1-inch staple lengths, mills in the United States obtain the largest proportion of their supply from the Southeastern States. A substantial part

of the 1-inch cotton is obtained from the Mississippi Valley States, which are also the source of the major part of the cotton longer than 1 inch. About 75 percent of the cotton 1-1/16 inches in staple length, 90 percent of the 1-1/8 inches, and 85 percent of the 1-3/16 inches and longer is obtained from these States.

Among the factors determining the staple length of cotton used by a mill are: (1) the product or products manufactured, (2) relative prices of cotton of various staple lengths, and (3) the type of mill equipment used.

The staple length used for a given product will depend primarily upon the yarn count, the strength, and other specifications desired in the yarn. Short staples customarily are used for the coarse yarns and fabrics and the longer staples for the finer goods or goods having special strength requirements.

Mills using long-draft equipment have a greater degree of flexibility in the staple length of cotton used than mills using regular-draft equipment. Approximately 46 percent of the cotton spindles in place in the United States now employ the long-draft principle. There has also been a recent trend toward high-speed equipment. The use of long-draft and high-speed equipment has apparently tended to increase the staple length of cotton used, since by the use of such cotton with this equipment, it has been possible to eliminate certain processes and thereby reduce manufacturing costs. In mills using regular-draft equipment, mechanical adjustments are necessary before a change can be made from one staple length to another length. Such adjustments are expensive and are made for the manufacture of a given product only on what is believed to be a fairly permanent basis.

The optimum staple length for the manufacture of a given product depends upon relative prices of various staple lengths as well as upon other factors. The optimum staple length in any given case is one so adapted to the production of the product that if a shorter one were used, increased manufacturing costs would more than offset the decreased cost of raw cotton, or if a longer staple were used, the increased cost of raw cotton would more than counterbalance the reduction in manufacturing costs.

During recent years, there has been a pronounced trend toward a demand for better quality in all types of cotton goods. This has operated to increase the demand for cottons of the medium and long staples and to decrease the demand for short-staple cotton.

Approximately 84 percent of all domestic mill purchases of raw cotton are now described for grade in terms of the Official Cotton Standards of the United States, and 78 percent are thus described for staple length.

The purchase of cotton by variety as a means of supplementing commercial classification and of obtaining cotton of the character desired, appears to have possibilities in those areas where production has been standardized by variety. In most instances, the range in grades and in staple lengths is too great to permit purchasing by variety only. About 2 percent of the mills in the United States now specify variety in the purchase of their cotton.

There appears to be need for an appraisal of the program of cotton-quality improvement in the light of the now available information relative to the requirements and preferences of the cotton-textile industry and for a re-appraisal at frequent intervals to permit making adjustments in the qualities of cotton produced to conform with significant changes in mill requirements.

The mutual advantage to cotton growers and cotton manufacturers of coordinating cotton production with mill requirements, particularly from the standpoint of quality, emphasizes the need for the continuous assembling of adequate data with respect to mill requirements for raw cotton.

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